



Energy Efficiency and Renewable Energy
Federal Energy Management Program

How to Buy an Energy-Efficient Computer Monitor

Why Agencies Should Buy Efficient Office Equipment

- Executive Order 13123 and FAR section 23.704 direct agencies to purchase products in the upper 25% of energy efficiency, including all models that qualify for the EPA/DOE ENERGY STAR[®] product labeling program.
- Agencies that use these guidelines to buy efficient products can realize substantial operating cost savings and help prevent pollution.
- As the world's largest consumer, the federal government can help "pull" the entire U.S. market towards greater energy efficiency, while saving taxpayer dollars.

Federal Supply Source:

- General Services Administration (GSA)
www.fss.gsa.gov

For More Information:

- DOE's Federal Energy Management Program (FEMP) Help Desk and World Wide Web site have up-to-date information on energy-efficient federal procurement, including the latest versions of these recommendations.
Phone: (800) 363-3732
www.eren.doe.gov/femp/procurement
- Environmental Protection Agency (EPA) has ENERGY STAR[®] product listings and purchasing specifications.
Phone: (888) STAR-YES (782-7937)
www.energystar.gov
- EPA's "ENERGY STAR-labeled office equipment" home page has several downloadable guides to help users optimize energy savings from office equipment.
www.epa.gov/appdstar/esoe/index.html
- TCO is a labeling program for computers, monitors, and other office equipment that includes energy efficiency, environmental, and ergonomic criteria, as well as low electro-magnetic emissions.
Phone: (312) 781-6223
www.tco-info.com
- Lawrence Berkeley National Laboratory publishes the *User Guide to Power Management for PCs and Monitors*.
Phone: (510) 486-7089
eetd.lbl.gov/EAP/BEA/LBLReports/39466/
- Lawrence Berkeley National Laboratory provided supporting analysis for this recommendation.
Phone: (202) 646-7950

Efficiency Recommendation

Product Type	Recommended "Sleep" Mode	Best Available "Sleep" Mode
14" – 15" Color	15 watts or less ^a	1 watt
17" Color	15 watts or less ^a	1 watt
19" – 21" Color	15 watts or less ^a	2 watt

a) These models also include a "second-stage" sleep mode of 8 watts or less. Monitors with USB ports may use a few more watts of power in all modes (including "active" and "off").

The federal supply source for monitors is the General Services Administration (GSA). GSA's on-line ordering system, *Advantage!*, can be used to select and order monitors. Make sure that the model you order qualifies for the ENERGY STAR[®] label. All ENERGY STAR monitors meet this Efficiency Recommendation.

When contracting or buying from a commercial source, specify or select a model with the ENERGY STAR[®] label; check the EPA's list to see which monitors qualify for the label (see "For More Information").

Make sure that the power management features of your monitor have been "enabled" and are compatible with your computer and operating system. In most cases, look for a monitor with "DPMS" (Display Power Management Signaling) or "universal" power management signaling. Some flat-panel liquid crystal display (LCD) monitors use considerably less electricity than comparably-sized cathode ray tube models, but the extra first cost is still much more than the lifetime energy savings.

The time to recover from sleep to active mode varies; for convenience, look for a model with quick recovery time. Some models use an indicator light to signal use of the low-power mode.

Definition

"Sleep" mode refers to a low-power standby condition, which is entered automatically after a set period of inactivity. The monitor's active mode is restored when the user touches the mouse or the keyboard.

Where to Find Energy-Efficient Monitors



Buyer Tips

Most screen-savers do not significantly reduce power consumption. Some screen-saver software is compatible with ENERGY STAR computers and monitors; it initiates the sleep mode after displaying the screen-saver for a pre-set time.

Use your computer or monitor software to set the "idle time" delay to the shortest period consistent with your needs (for example, switch to sleep mode after ten minutes), for both first and second stage sleep modes.

Even for monitors with a low-power sleep mode, you can save more energy and possibly extend your monitor's lifetime if you manually shut it off completely at night, on weekends, and during long periods (two hours or more) of non-use during the day. Some monitors, for example those used to program network servers, are actually in use only a few hours per year but are left on constantly (8,760 hours). Leaving these monitors off, except when needed, is a very cost-effective strategy and will not shorten monitor lifetime.

For older monitors without an ENERGY STAR sleep mode, external control devices are available that shut the monitor off after a preset idle time. The monitor is then restarted when the keyboard or mouse is used. See the EPA's web site or hotline for product information.

Usage Tips

Monitor Cost-Effectiveness Example (17" Color)

Performance	Base Model	Recommended Level	Best Available
Annual Energy Use	370 kWh	100 kWh	70 kWh
Annual Energy Cost	\$22	\$6	\$4
Lifetime Energy Cost	\$75	\$20	\$15
Lifetime Energy Cost Savings ^a	–	\$55	\$60

Definition

Lifetime Energy Cost is the sum of the discounted value of annual energy costs based on average usage and an assumed monitor life of 4 years. Future electricity price trends and a discount rate of 3.4% are based on federal guidelines (effective from April, 2000 to March, 2001).

a) These savings do not include the benefit from reduced air-conditioning costs, which depend on location and building type.

Cost-Effectiveness Assumptions

Annual energy use in the above example is based on typical office operating practices, including a 9.5 hour work day (sleep mode for 5.5 hours/day) and 250 work days per year. Also, the example incorporates the assumption that 76% of monitors are turned on during a typical business day and 35% left on overnight and on weekends. The assumed electricity price is 6¢/kWh, the federal average electricity price in the U.S.

Using the Cost-Effectiveness Table

In the example shown above, a 17" color monitor at the Recommended efficiency level is cost-effective if its purchase price is no more than \$55 above the price of the Base Model. The Best Available model will be cost-effective if its price is not more than \$60 above the price of the Base Model. Adding ENERGY STAR features (power management) to a monitor does not add significantly to the cost.

Metric Conversion

1 inch = 2.54 cm

What if my Electricity Price or Usage is different?

To calculate Lifetime Energy Cost Savings for a different electricity price, multiply the savings in the above table by this ratio: $\left(\frac{\text{Your price in } \text{¢/kWh}}{6.0 \text{ ¢/kWh}} \right)$. If usage of your monitor differs from the assumptions shown above, your energy operating costs and savings will also vary. For example, in cases where a monitor is left on every hour of the year but only in active use for four hours per workday, the advantages of a low-power sleep mode are even greater. In this case, Lifetime Energy Cost Savings for the Recommended and Best Available models over the Base Model would be \$130 and \$140, respectively.

